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ARTICLE VIII.

OBSERVATIONS ON THE EXTINCT PECCARY OF NORTH AMERICA; BEING A SEQUEL TO "A MEMOIR ON THE EXTINCT DICOTYLINÆ OF AMERICA."

BY JOSEPH LEIDY, M. D.

[Read November 21, 1856.]

IN attempting to determine extinct animals from a few remains, we are frequently perplexed to know whether one or more species of a genus or of several genera are indicated. Were specific characters unvarying, which perhaps could not be the case, the difficulty though lessened would not be removed, for recent animals exhibit the fact, that while many species are well characterized by external marks, they are not so by the dentition and skeleton.

At the period of publishing "A Memoir on the Extinct Dicotylinae of America," in the Transactions of this society, (Vol. X., p. 323,) feeling dissatisfied with the results, I determined to reinvestigate the subject, which having done, with the aid of additional material both recent and fossil, I have come to the conclusion that all the Dicotylina animals supposed to be indicated by the fossil remains, described in the memoir just mentioned, really belong to one species of Peccary.

In comparing a considerable number of skulls of the recent *Dicotyles torquatus*, I find that variations occur equal in value to the characters upon which the different Dicotylina genera and species have been proposed by Dr. Le Conte and myself.

Notice of variations in the skull of the recent Dicotyles torquatus.—The skull of *Dicotyles torquatus* varies considerably in size; the smallest and largest adult specimens observed differing more than an inch in length. It also varies in the breadth and convexity of the forehead; in the length and thickness of the parietal crest; in the width and prolongation of the face; in the degree of extension forward of the malar ridge; in the concavity of the malar bones; in the extent of inversion of the angle of the lower jaw; the breadth of the

symphysis; and indeed hardly an anatomical feature can be mentioned which does not present considerable variation among a large number of skulls.

In examining the dentition, all the teeth will be found to vary considerably in size, though generally only in proportion with a variation in the size of the skull. The crowns of the first and second lower incisors indicate more or less tendency to become bilobed; sometimes the appearance is quite strong, at others feeble. The crowns of the upper incisors, vary in the degree of development and irregularity of their basal ridge, and in the degree of concavity of their interior surface. The canines vary in robustness and in the degree of divergence. Those below differ in the extent of development of the exterior ridge, which is sometimes very prominent, and occasionally is nearly obsolete. Usually the upper ones have an even surface, but sometimes present a longitudinal groove on one or both sides. As the crowns of the canines are worn down, their fangs become thickened by a deposit of cementum.

Of the inferior molars, the last true one varies considerably in its exact form and proportions. It is oblong ovoid, trilateral, or oblong square. It sometimes presents five, nearly uncomplicated, mammillary tubercles; at others the unsymmetrical tubercle is more or less subdivided, and the crown generally presents a more complex appearance by the introduction of offsets from the principal tubercles; and sometimes the fifth lobe degenerates into a thick basal ridge. The anterior true molars vary in the extent of corrugation of their lobes. The inferior premolars vary considerably in form. Their crown generally is ovoid, and usually presents in succession a small anterior tubercle, a transverse pair of large mammillary tubercles, and a broad tubercular heel. The anterior tubercle is sometimes nearly obsolete, especially in the first premolar, and occasionally in the last one. Not unfrequently the last premolar assumes the appearance more or less complete of a true molar.

The superior molars vary in corresponding characters with the lower ones. The last of the series has a more or less square, or ovoidal crown, is variably corrugated, and has a posterior basal ridge varying in extent of development. The last premolar varies in form from that of the teeth preceding it to that of the succeeding true molars. The second premolar resembles the one below, except that it is more square; and sometimes, it also assumes the appearance of a true molar. The crown of the first premolar varies in the degree of development of its tubercles and basal ridge.

The value of sexual differences in the skull of *Dicotyles torquatus*, I have not been able to ascertain for want of authentic specimens of the two sexes, but perhaps the smaller skulls with less robust teeth, above indicated, belong to the female, while the others belong to the male.

Remarks on the discovery of remains, and distinctive characters of the extinct Peccary.—Remains of the Peccary have been discovered in Illinois, Kentucky, Iowa, Missouri, and Virginia. The most important specimen yet obtained of these remains, is a nearly perfect skull, completely unchanged in original texture, which was found in a saltpetre cave in Kentucky, and was presented by Dr. Samuel Brown, in 1805, to the American Philosophical Society, in the cabinet of which it remained for nearly half a century with the impression of all who examined it, that it was the skull of a recent Peccary. More accurate information of the exact locality in which the specimen was found I have not obtained.

The first remains of the extinct Peccary of North America were described by Dr. John L. Le Conte, from specimens obtained by Mr. Snyder, of Galena, Illinois, in the vicinity of that city. These remains consisted of a number of bones and teeth, with fragments of others, and were found in association with remains of an extinct species of *Procyon* and a tooth of an extinct genus to which Dr. Le Conte gave the name of *Anomodon*.

In a recent visit to Galena, Illinois, through the aid of Dr. E. D. Kittoe, and Dr. Hempstead, of that city, I had an opportunity of examining the localities in which fossil remains of the Peccary are found; and Dr. Kittoe gave me a number of additional specimens. The localities referred to, occur in the cliff limestone,* which is widely extended through Wisconsin and portions of Illinois and Iowa, is full of irregular fissures containing lead ore, and is remarkable for the singular weather-worn and castellated appearance it presents in exposed situations. Within the lead-bearing crevices, in the vicinity of Galena, bones have frequently been found, and they may also have been discovered even more frequently in similar positions in Wisconsin, but as yet, I have seen no evidence of such discovery. The bones are generally exceedingly friable, often chalk white and resembling recent ones calcined; and they are enveloped in a loose or more or less compact matrix of brown ferruginous sand. Occasionally, the remains are found in abundance, and in one instance a miner informed Dr. Kittoe that for several days together he had been engaged in removing bones from a lead crevice, but not knowing they were of any value, they were thrown among other rubbish removed from the mine, where from their very great friability, they were soon destroyed through the action of the weather. At my instigation, Dr. Kittoe employed two miners to enter a deserted lead crevice, in which it was stated bones had been found; and after some trouble in removing rubbish that had fallen in from above, they obtained about a quarter of a peck of bones and fragments of the extinct peccary, together with a few fragments of bones and numerous incisor and a few molar teeth of four rodents. These latter may, on subsequent investigation, prove to be extinct species,

* An appropriate name given to it by Dr. D. D. Owen, who says this rock is a subdivision of the mountain limestone group.

but the remains are not distinguishable in anatomical character from the corresponding parts of the recent *Arctomys monax*, *Pseudostoma bursarius*, *Lepus sylvaticus* and *Arvicola*.

A list of the Dicotyline remains which have been obtained at Galena, is given in the concluding portion of this paper.

Of other remains of the Peccary, Dr. R. W. Gibbes obtained a small fragment of the lower jaw with a canine tooth, described by Dr. Le Conte, from Benton Co., Missouri, where it was discovered in association with the remains of the *Mastodon*.

Recently, Dr. Le Conte presented to the Academy of Natural Sciences, a small fragment of the lower jaw containing the last temporary molar tooth, of the extinct peccary, from Augusta County, Virginia.

Through the kindness of Professor Wyman, I have lately had the opportunity of examining a number of remains of the extinct peccary, discovered in Iowa, by Dr. Foster. The remains consist of one half of the lower jaw with the canine and molar teeth, the upper jaw with the molars, and a malar bone of an adult animal, together with fragments of the skull of a very young animal.

Upon the observed varieties of structure in the first collection of remains of the extinct peccary, obtained through Mr. Snyder of Galena, and described by Dr. Le Conte, were proposed the names of *Platygonus compressus*, *Hyops depressifrons*, *Dicotyles depressifrons*, *Protochoerus prismaticus*. Upon a small fragment of the lower jaw with one canine tooth of the same extinct species of peccary, from Benton Co., Missouri, also described by Dr. Le Conte, the name of *Dicotyles costatus* was proposed, and upon the cave head from Kentucky, described by myself, the name of *Euchoerus* (*Protochoerus macrops*) was proposed. All these I am now inclined to believe belong to a single extinct species of peccary, and must be included under the name of *Dicotyles compressus*, unless the anatomical characteristics, which have been given in detail in my former memoir on the Extinct Dicotylinæ of America, should be considered subgeneric, when the original name of *Platygonus compressus* must represent the whole of those which have been employed. All the points of variation in the different specimens described in the memoir just referred to, find their corresponding equivalents in different individuals of the recent *Dicotyles torquatus*, and therefore cannot be allowed to retain the value that we too hastily had given them.

The extinct *Dicotyles compressus*, was a little larger than the existing *Dicotyles labiatus*, and its other most important differences from this and the more common species, *D. torquatus*, chiefly observable in the skull, are briefly as follows. The face is more prolonged and narrower, the upper outline of the head is less inclined from the horizon, the forehead is much broader, the cheeks deeper, the orbits have a more supero-posterior position, the sides of the inion are less oblique, the technical angle of the lower jaw is strongly everted and the

symphysis is narrow and keeled, the incisor teeth are smaller, and the principal lobes of the molar teeth possess a greater proportionate degree of development.

Comparison in the varieties of dentition observed in Dicotyles compressus.—In figures 5, 6, plate 37 of volume X. of these Transactions, is given a representation of the right upper series of molar teeth, of the cave head, formerly viewed as characteristic of *Euchoerus macrops*. The teeth may be observed to be constructed on the same plan as those of the recent peccaries, but strikingly to differ in the greater degree of development of their primary lobes.

In figure 2, plate 6, accompanying this communication, is represented the corresponding series of teeth, from the Iowa fossil in possession of Dr. Wyman. These teeth have slightly more robust proportions than those in the cave head; and they also belong to an adult individual, whereas in the latter, the permanent premolars and last true molar, had not yet protruded from the gums. The crown of the last true molar in the Iowa fossil, is less narrowed posteriorly than in that of the cave head, its postero-external lobe is proportionately with its fellow much better developed, and the basal ridge does not extend exterior to the latter, as it does so conspicuously in the cave head. In the preceding true molars, the lateral offsets of the inner lobes are rather better developed than in the cave head. The crowns of the premolars have rather different outlines in the two fossils; and in the case of the first of the series, it is trilateral in the Iowa specimen, and quadrilateral in the cave head. In the last two premolars the thick basal ridge continues around the inner side in the former, as in the first premolar, but does not do so in the cave head.

In the imperfect series of isolated upper molars, represented in figs. 12, 13, plate 37, volume X., formerly referred to *Platygonus compressus*, a condition is observable in the last two true molars, so different from that in the teeth just disposed of, that if they had been discovered unassociated with congeneric remains, almost any naturalist would have supposed they belonged to a taperoid, rather than to a dicotyline animal. The crown of the last true molar, has its unsymmetrical lobe in a most rudimental condition; and it has a quadrilateral oval outline instead of being trilaterally ovoidal. In this and the preceding tooth trituration has advanced more in clearing out the transverse valleys, than in wearing away the summits of the lobes, so that the teeth have assumed an appearance resembling that of the inferior molars of the Tapir, whereas in the recent peccaries ordinarily, and as is also observable in the corresponding teeth of the Iowa fossil, fig. 2, plate 6, the summits of the lobes are worn away without clearing out the transverse valleys. These facts would lead to the supposition that we really had before us the remains of two distinct genera of animals in which the trituration of the teeth proceeded on a different plan, but an inspection of the first and second true molars in the cave head, and the inferior true molars of *Dicotyles compressus* led me to view the difference as only another individual peculiarity

of the fossil species just named. The premolars of the series under examination, fig. 12, pl. 37, resemble more closely those of the cave head than of the Iowa fossil, except the first tooth, which differs from the corresponding one of both these fossils in being smaller and in possessing but a single large conical lobe.

Figures 14, 15, pl. 37, vol. X., represent another imperfect series of isolated upper molars, formerly referred to *Platygonus compressus*, and these teeth nearly resemble the corresponding ones indicated in the former figures and those of the cave head.

Figure 11, pl. 37, further represents a series of unworn premolars contained in a fragment of a skull, formerly also referred to *P. compressus*, and these resemble the isolated ones of fig. 12, pl. 37, but unworn.

In figures 7, 8, plate 37, is given a representation of the inferior right series of molars of the cave head above referred to, in which the same striking increase in development of the principal lobes is observable, in comparison with their condition in the recent peccaries, as in the case of the upper molars.

In figure 3, pl. 6, we have a representation of a corresponding series of teeth, to that just indicated, from one of the Iowa fossils, in possession of Prof. Wyman. The teeth of this fossil are slightly more robust than those of the cave head, and the premolars are less square or are more laterally compressed, a variation which is frequent in different individuals of the recent *Dicotyles torquatus*. In the last true molar, the contiguous sides of the anterior pair of lobes are much less concave than in the cave head, and the unsymmetrical lobe is almost simple, while it is subdivided in the latter.

In an inferior series of molars, contained in a fossil fragment, from Galena, presented by Dr. Edward Kittoe, the teeth are considerably smaller than in either of the corresponding series just dispensed with, and the transverse valleys of the true molars appear rather more open in consequence of a less proportionate degree of development of the lateral offsets of the inner lobes. In the last molar the unsymmetrical lobe forms a single large conical tubercle.

Figure 10, plate 37, represents two inferior back molars, contained in the fragment of a lower jaw, formerly attributed to *Platygonus compressus*. The teeth pretty closely resemble the corresponding ones of the series last indicated in a more worn condition; and in the open transverse valleys, they bear much likeness to the opposing upper teeth of fig. 13, which accompanied them.

We further possess two isolated, slightly worn, back inferior molars, from Galena, one of which presents a variation from the more common condition in having its unsymmetrical lobe diminished in size and enclosed by a thick basal ridge.

Figure 18, plate 37, represents the fragment of a back inferior molar, formerly viewed

as characterizing *Protochoerus prismaticus*. In comparison with the last molars of *Dicotyles torquatus*, represented in figures 1 and 3, plate 37, it would be considered to belong to the lower jaw, but in comparison with the corresponding teeth in the cave head, figures 5 and 7, it would certainly be viewed as belonging to the upper jaw.

As indicative of the smaller size of the incisors of *Dicotyles compressus*, in comparison with those of the recent peccaries; representations of the following specimens, presented by Dr. Kittoe, are given in plate 6, accompanying this communication. Figure 4, an anterior view of the first superior incisor of the left side; figure 5, a view of the upper right lateral incisor; and figures 6, 7, lateral views of the first and second inferior incisors. The third inferior incisor, of the cave head, of *D. compressus* is represented in figure 19, plate 37, vol. X. of these Transactions.

List of remains of the extinct Peccary, (DICOTYLES COMPRESSUS,) observed by the author.—

1. An almost perfect skull accompanied with the lower jaw, entirely unchanged in texture. It was discovered in a saltpetre cave in Kentucky, and was presented to the American Philosophical Society, in 1805, by Dr. Samuel Brown; and is now deposited in the cabinet of the Academy of Natural Sciences. It has lost a portion of the nasal bones, the incisors of both jaws, and one upper canine. On both sides it contains all the permanent molars, of which the premolars and the last true molar were just ready to be protruded. On one side in the upper jaw, three temporary molars are retained, but all the other series are lost, though they had not yet been shed. Trans. Am. Phil. Soc. 10, 342, plates 35, 36, 37, figs. 5—8. Referred to *Euchoerus (Protochoerus) macrops*.

2. Fragment of the right side of the lower jaw, of an adult individual, containing the last two molar teeth. Trans. Am. Acad. Arts and Sci. III., pl. 3, fig. 7; Trans. Am. Phil. Soc. X., pl. 38, fig. 3; pl. 37, figs. 9, 10. Referred to *Platygonus compressus*.

3. Fragment of the face, of a young animal, containing three premolars and portions of both canines. Trans. Am. Ac. Arts, III., pl. 1, 2, fig. 5 a.; Trans. Am. Phil. Soc. X., pl. 38, fig. 2; pl. 37, fig. 11. Referred to *Platygonus compressus* and *Hyops depressifrons*.

4. Upper portion of the cranium. Tr. Am. Phil. Soc. X., pl. 38, fig. 1. Referred to *Hyops depressifrons*, and *Dicotyles depressifrons*.

5. Three imperfect series of upper molars, from two individuals. Tr. Am. Acad. III., pl. 3, figs. 12, 13, 13; Tr. Am. Phil. Soc. X., pl. 37, 12—15. Referred to *Platygonus compressus*, *Dicotyles depressifrons*, *Hyops depressifrons*.

6. An upper canine. Tr. Am. Acad. III., pl. 3, figs. 9—11; Tr. Am. Phil. Soc. X., pl. 37, fig. 16. Referred to *Platygonus compressus*.

7. Fragments of a frontal and malar bone, a dorsal and lumbar vertebra, the lower portion of a humerus, the left fore-arm bones, and a cuboid and metatarsal bone. Tr. Am. Acad. III., pl. 2, figs. 4, 5, b., 6; pl. 3, fig. 14; pl. 4. *Platygonus compressus*.

8. The fragment of a last molar tooth. Tr. Am. Phil. Soc. X., pl. 37, fig. 18. Referred to *Protochoerus prismaticus*.

9. Three inferior canines and a much worn lower molar tooth.

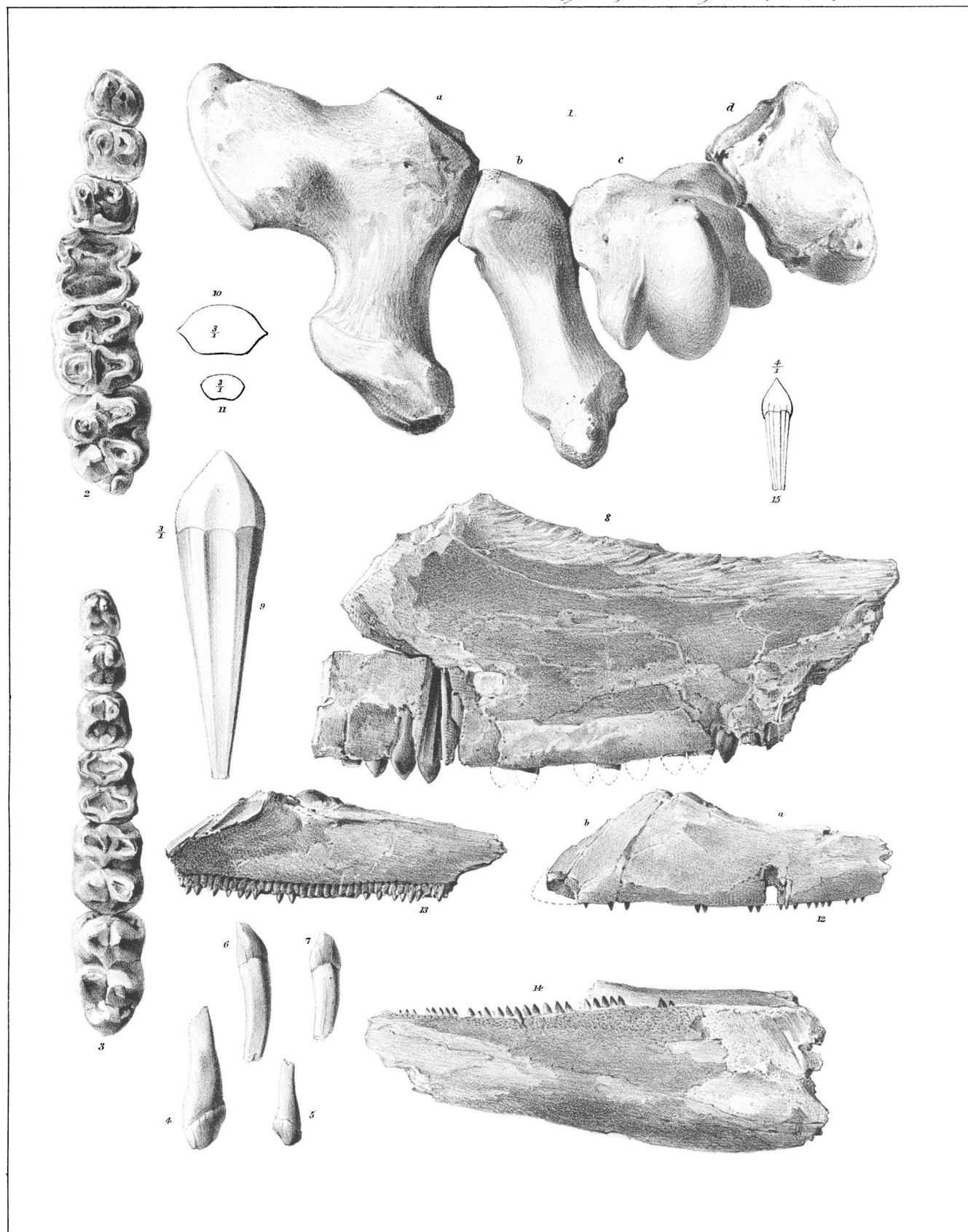
10. Small fragments of an upper and a lower jaw, of an atlas and of several ribs; three mutilated lower extremities of the humerus; fragment of a radius; two thirds of a hip bone and fragments of a second; an entire femur seven inches long and two and one third inches in circumference at the middle of the shaft; fragments of another femur, fragments of two tibiæ; three calcanea; two astragali; fragments of two metacarpals; two first phalanges, and one second phalanx. All these specimens appear to have been derived from three individuals, and the same to which the fragments belonged which were supposed to characterize *Platygonus compressus* and *Hyops s. Dicotyles depressifrons*.

The specimens of the list from number 2 to 10 inclusive, were obtained by Mr. Snyder of Galena, from the vicinity of that city, and have been presented by Dr. Le Conte, to the Academy of Natural Sciences, where they are now preserved.

11. The incisive portion of the lower jaw, with the right canine tooth. Referred to *Dicotyles costatus*. Obtained through Dr. R. W. Gibbes, from Benton Co., Missouri, where it was found in association with bones of the Mastodon, and presented to the Academy of Natural Sciences by Dr. Le Conte.

12. Two much worn upper and two lower canines; fragments of a lower jaw, with an entire series of molars of one side, and four molars of the opposite side; three last lower molars of as many other different individuals; fragments of the lower jaw of a young individual containing the last temporary and the first permanent true molar; three upper and two lower incisors. Also, besides a quart measure full of small fragments of vertebræ, and of bones of the extremities, the following:—fifteen mutilated vertebræ; part of a scapula; two humeri embedded in ferruginous sand, and measuring seven inches in length; lower extremity of another humerus, one inch and a half in transverse diameter; two olecranon processes; several carpal bones; a pair of co-ossified metacarpals, three inches long and one inch wide at the base; several isolated metacarpals, and halves of metatarsals; four first phalanges, two second, and two last ones; portions of two hip bones; extremities of four femora; one patella; two heads of tibiæ, measuring one inch and three quarters in transverse diameter; distal end of another tibia; two calcanea, two and three quarter inches long; one astragalus, and several other tarsal bones. All these specimens were obtained by Dr. Edward Kittoe, from the lead crevices of the cliff limestone rocks of Galena, Illinois, and have been presented to the Academy of Natural Sciences.

13. A fragment of the lower jaw, of a young animal, containing the last temporary molar unworn. The first permanent true molar had not yet commenced to protrude. The specimen was from Augusta Co., Virginia.



T. Sinclair lith.

1. *Megalonyx Jeffersonii*, Harlan. 2-7, *Dicotyles compressus*, Leidy.
8-11 *Saurocephalus lanciformis* Harlan. 12-15, *S. leanus*, Harlan.

14. The half of a lower jaw, the upper jaw with the molar teeth, and other fragments, belonging to several individuals; found by Dr. Foster, in Iowa, and now in possession of Prof. Wyman, who proposes shortly to give a more complete account of them, together with some other interesting fossils discovered in association.

REFERENCES TO PLATE 6.

Figure 2. Series of upper molars of the extinct peccary, *Dicotyles compressus*. From a specimen discovered in Iowa. Fig. 3. Series of lower molars from the same individual. Figs. 4, 5. Upper incisors of *D. compressus*. Figs. 6, 7. Inferior incisors of *D. compressus*.